I claim:

1. A scale comprising:

a. a signal emissions device configured for emitting a signal,

b. a receiver device configured for receiving the signal,

wherein the signal emissions device and the receiver device are arranged to measure a deflection of a structural member.

2. The scale according to claim 1 wherein the signal emissions device is an infrared light emitting diode (LED).

3. The scale according to claim 1 wherein the signal emissions device is a laser.

4. The scale according to claim 1 wherein the deflection of the structural member is caused by an applied load.

5. A scale according to claim 1 further comprising a tube, optics, and an amplifying device arranged to measure the deflection of the structural member caused by an applied load.

6. The scale according to claim 5 wherein the tube has a coaxial bore.

7. The scale according to claim 5 wherein the bore has multiple diameters that align the optics.

8. The scale according to claim 5 wherein the tube is mounted in parallel with a transverse axis of a load vector on the structural member.

9. The scale according to claim 5 wherein the tube is mounted such that the tube flexes with the structural member when the applied load contacts the structural member.

10. A scale comprising

optics including a sensor package; and

an emission device configured to communicate with the optics wherein the emission device is configured to transmit a signal through a tube.

11. The scale according to claim 10 wherein the signal from the emission device further comprising a light beam travels through a length of the tube to a face of the sensor array located at an opposite end of the tube.

12. The scale according to claim 10 wherein the sensor package includes a four-cell photoelectric array.

13. The scale according to claim 10 further comprising two two-cell sets which are separated by a division that is parallel to a direction of an applied weight.

14. The scale according to claim 10 further comprising two two-cell sets which are separated by a division that is transverse to a direction of an applied weight.

15. The scale according to claim 10 further comprising four elements which are configured such that one set of two elements is above and one set of two elements is below a separation that is transversely aligned to a direction of an applied weight.

16. The scale according to claim 10 wherein the tube further comprises a bore having a narrow aperture positioned between the emission device and the sensor package and proximate to the emission device.

17. The scale according to claim 16 wherein the narrow aperture restricts the signal from the emissions device.

18. The scale according to claim 16 wherein the narrow aperture is configured to align a wide dimension transversely to a force vector of an applied weight and align a narrow dimension parallel to the force vector of the applied weight.

19. The scale according to claim 16 wherein the narrow aperture is configured to configured such that a long dimension of the signal covers a face of the sensor package.

20. The scale according to claim 16 wherein the narrow aperture includes a narrow dimension that is configured such that approximately half of a face of a four-cell photoelectric array is covered by the signal from the emission device.

21. The scale according to claim 10 wherein the signal covers approximately a lower half of an upper two-cell set and an upper half of a lower two-cell set when the scale is in the no-load condition.

22. The scale according to claim 10 wherein signal covers approximately a lower one-third of an upper two-cell set and an upper two-thirds of a lower two-cell set when the scale is substantially loaded.

23. The scale according to claim 22 wherein a portion of the upper two-cell set remains covered by the signal and a portion of the lower two-cell set remains darkened when a load is applied to the scale.

24. The scale according to claim 10 wherein the optics are protected from contamination, light, and environmental hazards by the tube.

25. The scale according to claim 10 wherein the signal from one cell of the upper set and one cell of the lower set are differentially amplified to obtain a resultant signal that is proportional to a load on the scale.

26. The scale according to claim 10 wherein the signal are amplified to produce a feedback signal for a temperature correction.

27. The scale according to claim 25 wherein the amplification of the resultant signal is converted from analog to digital.